

Automation: EO-1, Sensor Web, ST-5 Code 584 / Dan Mandl

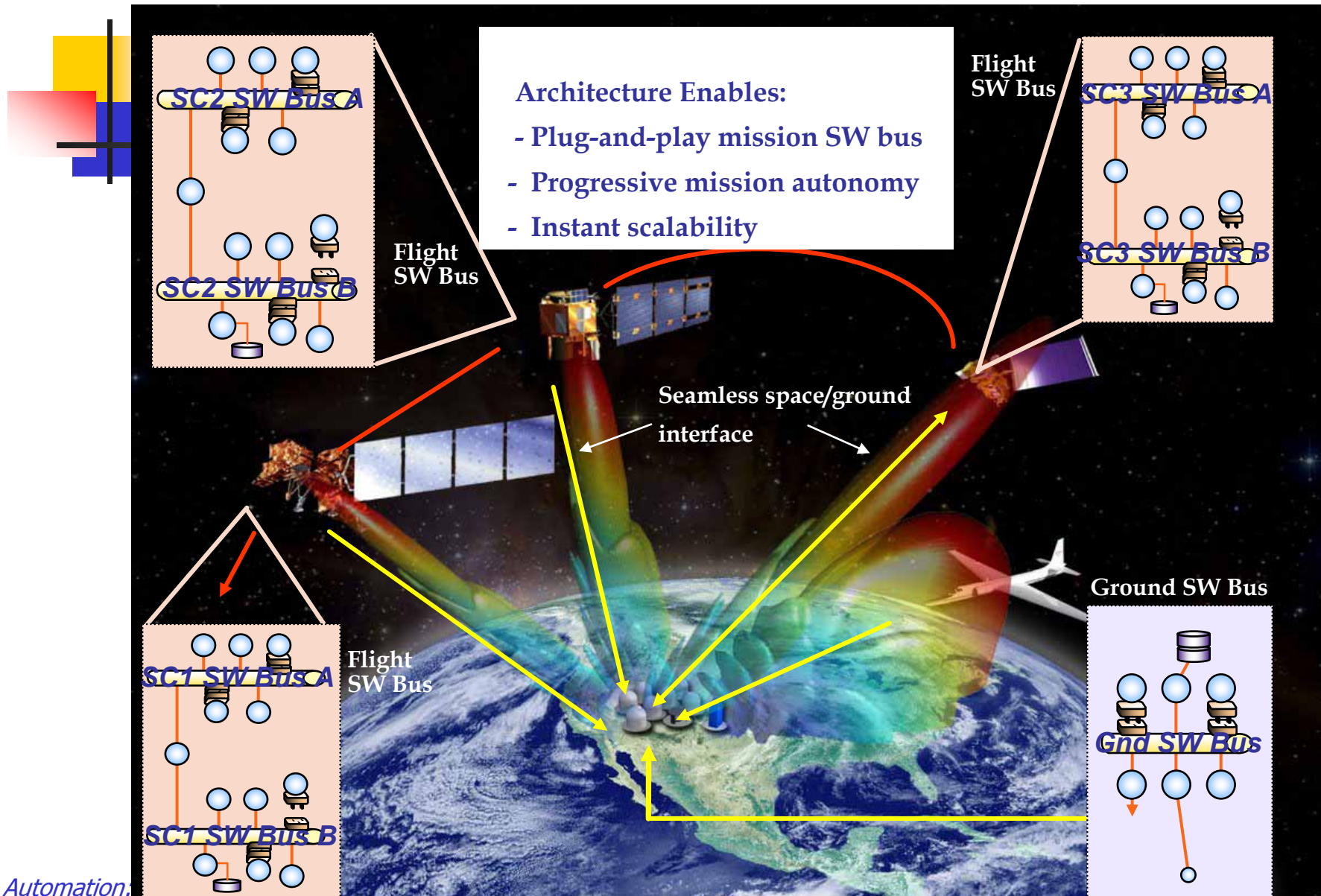
ISD Technology Workshop Jan 24, 2005



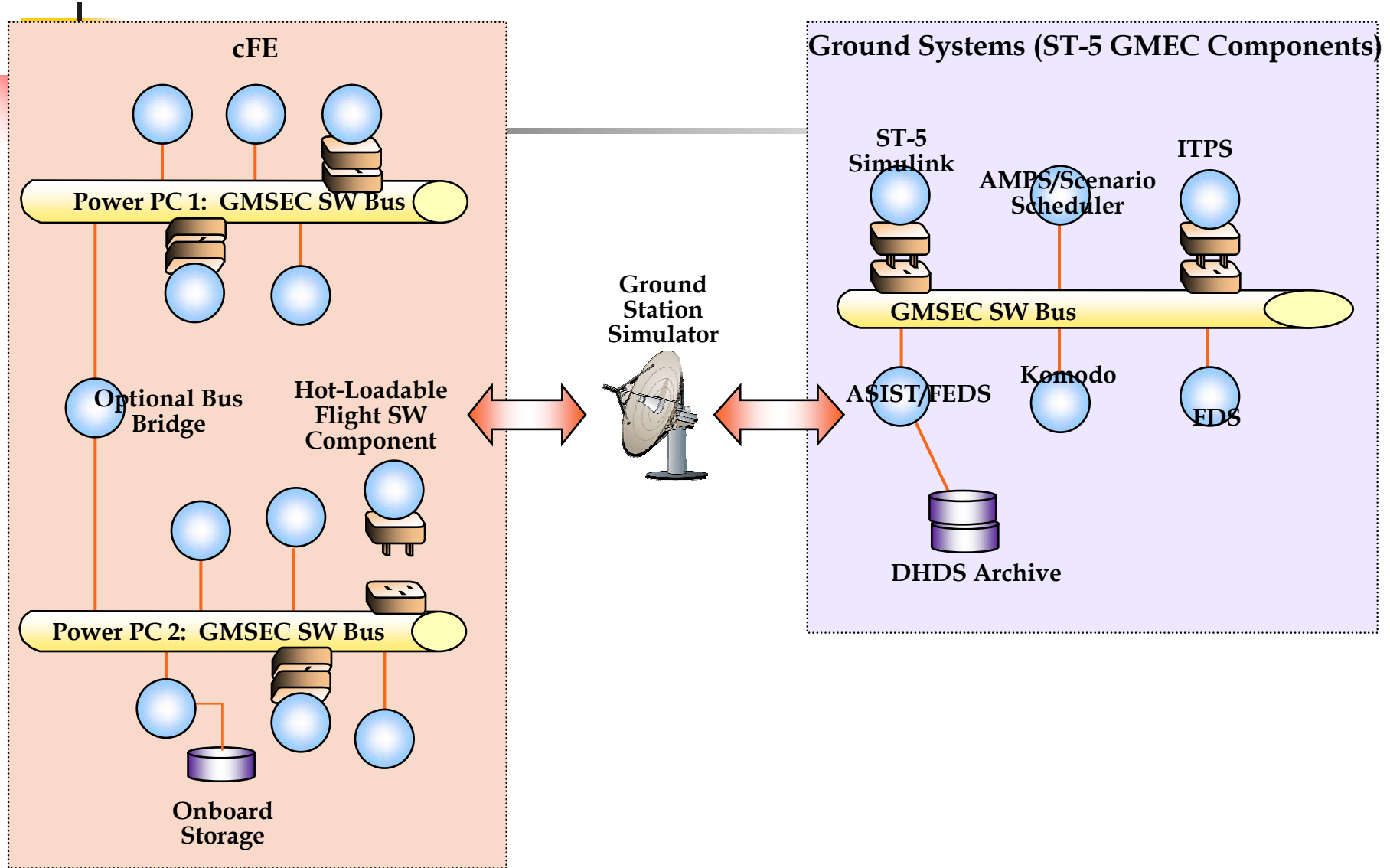
Goals, Objectives, Benefits

- Goal is to create a mission end-to-end software backplane
- Benefits
 - Rapid mission reconfiguration
 - Mission flexibility
 - Mission component reuse
 - Progressive mission autonomy
 - Builds on GMSEC concept

Vision for End-to End Mission Architecture



Mission Autonomy Testbed

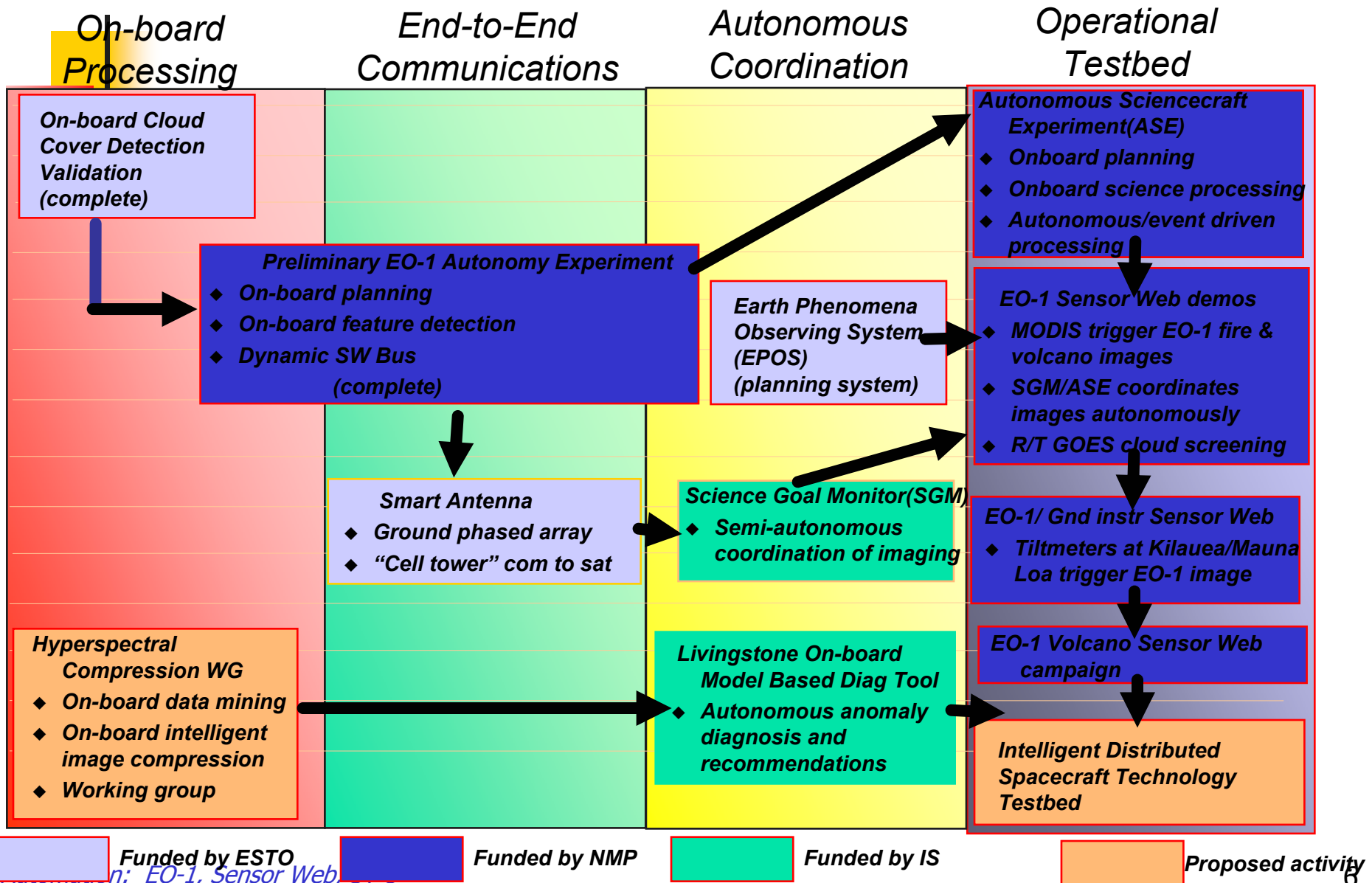




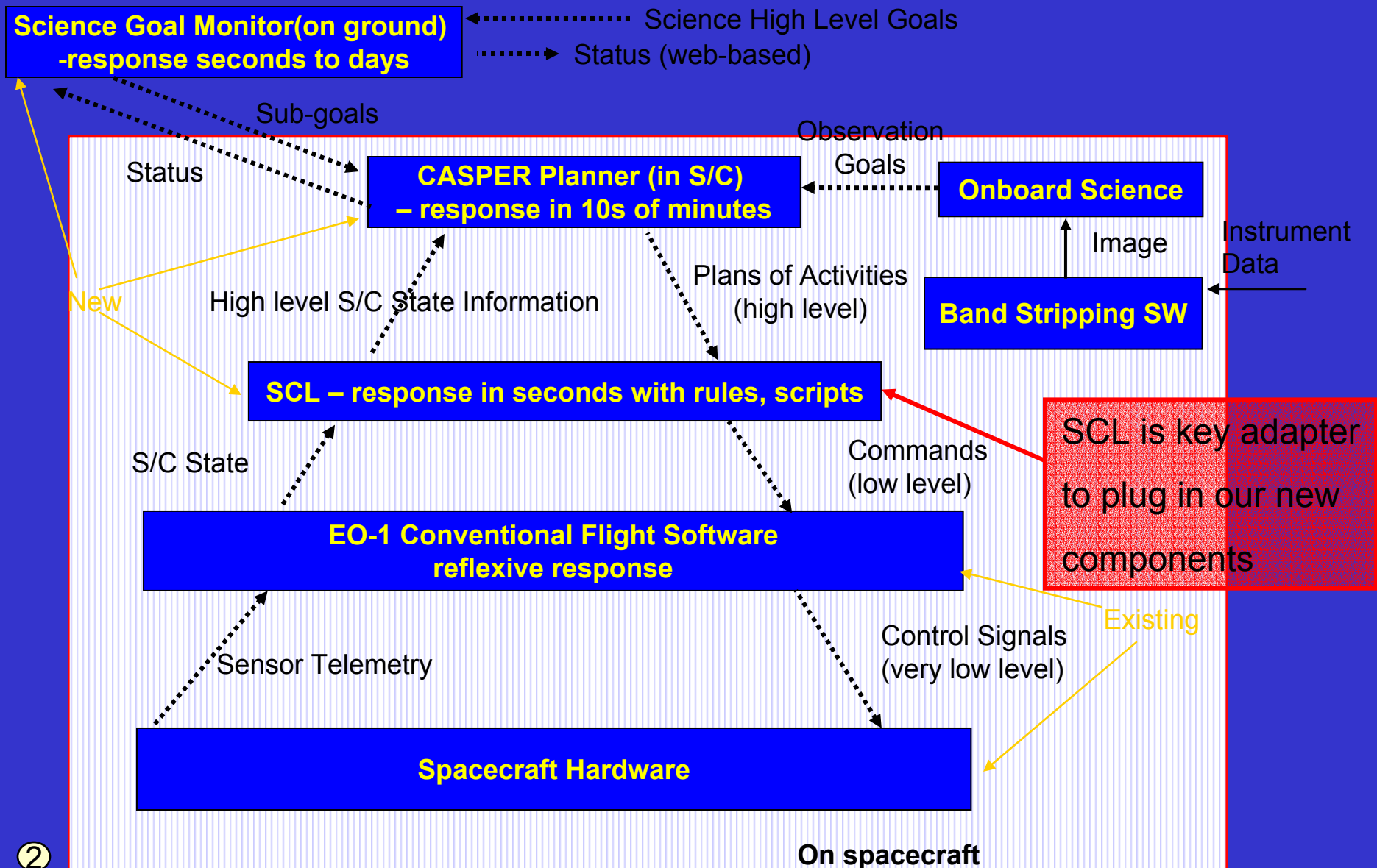
Components on Initial Autonomy Testbed

- ST-5 GMSEC suite including ST-5 Simulink model-base operations software
- cFE
 - Core reusable flight SW components
- Level 0 and Level 1 processing onboard – GSFC
 - Onboard cloud screening
- Autonomous Sciencecraft Experiment (ASE) – JPL
 - Onboard scheduling
 - Onboard science processing (feature detection)
 - Onboard autonomy
- Livingstone – AMES
 - Onboard model-based diagnostic software
 - Being considered for LISA
- Ground station simulator
- Wireless access point to simulate space to ground link

Related Funded Tasks Towards This Vision Using EO-1



Example of how we are attempting to tie together Onboard and ground planning and scheduling tools





EO-1 Virtual Observatory

- Have been automating EO-1 operations over the past year using:
 - MOPSS
 - SGM
 - ASPEN
 - ASE
 - SCIMAN
 - EPOS
 - Sensorweb capabilities
 - E.g. cloud screening using other satellites such as GOES
 - SGM gateway
 - Allows direct command loads without operator intervention



Future Implications

- Building the autonomy testbed allows validation of a mission software backplane concept
 - Will enable future missions such as LISA, Flora and LRO to adapt these capabilities
 - Will enable some present missions such as Terra, Aqua and Aura to retrofit appropriate functionality to improve present operations
 - Will facilitate interoperability between components developed by different groups
 - Will provide a place to integrate various components to test concepts and then to sell ideas to future missions
 - Instills idea that certain capabilities are real and not “vaporware”